**Critical Values for the One-sample Kolmogorov–Smirnov test**

Table 1 gives critical *D*-values for various ** for both 1-sided and 2-sided tests when comparing an empirical cumulative distribution to an *unknown\** normal distribution. This is customarily called *Lilliefors’s Test for Normal Distribution*.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample size*, n* | ** | ** | ** | ** |
| 4 | 0.344 | 0.375 | 0.414 | 0.432 |
| 5 | 0.320 | 0.344 | 0.398 | 0.427 |
| 6 | 0.298 | 0.323 | 0.369 | 0.421 |
| 7 | 0.281 | 0.305 | 0.351 | 0.399 |
| 8 | 0.266 | 0.289 | 0.334 | 0.383 |
| 9 | 0.252 | 0.273 | 0.316 | 0.366 |
| 10 | 0.240 | 0.261 | 0.305 | 0.350 |
| 11 | 0.231 | 0.251 | 0.291 | 0.331 |
| 12 | 0.223 | 0.242 | 0.281 | 0.327 |
| 14 | 0.208 | 0.226 | 0.262 | 0.302 |
| 16 | 0.195 | 0.213 | 0.249 | 0.291 |
| 18 | 0.185 | 0.201 | 0.234 | 0.272 |
| 20 | 0.176 | 0.192 | 0.223 | 0.266 |
| 25 | 0.159 | 0.173 | 0.202 | 0.236 |
| 30 | 0.146 | 0.159 | 0.186 | 0.219 |
| 40 | 0.127 | 0.139 | 0.161 | 0.190 |
| 50 | 0.114 | 0.125 | 0.145 | 0.173 |
| 60 | 0.105 | 0.114 | 0.133 | 0.159 |
| 75 | 0.094 | 0.102 | 0.119 | 0.138 |
| 100 | 0.082 | 0.089 | 0.104 | 0.121 |
| *n* > 100 |  |  |  |  |

\*The parameters of the normal distribution are computed from the sample.

For sample sizes in-between rows use linear interpolation.

[From: *Nonparametric Statistical Interference*, 5th Edition, 2011, CRC Press]

**Critical Values for the One-sample Kolmogorov–Smirnov test**

Table 2 gives critical *D*-values for various ** for both 1-sided and 2-sided tests when comparing an empirical cumulative distribution to an *unknown\** normal distribution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| One-sided | ** | ** | ** | ** | ** |
| Two-sided | ** | ** | ** | ** | ** |
| *n* = 1 | 0.900 | 0.950 | 0.975 | 0.990 | 0.995 |
| 2 | 0.684 | 0.776 | 0.842 | 0.900 | 0.929 |
| 3 | 0.565 | 0.636 | 0.708 | 0.785 | 0.829 |
| 4 | 0.493 | 0.565 | 0.624 | 0.689 | 0.734 |
| 5 | 0.447 | 0.509 | 0.563 | 0.627 | 0.669 |
| 6 | 0.410 | 0.468 | 0.519 | 0.577 | 0.617 |
| 7 | 0.381 | 0.436 | 0.483 | 0.538 | 0.576 |
| 8 | 0.358 | 0.410 | 0.454 | 0.507 | 0.542 |
| 9 | 0.339 | 0.387 | 0.430 | 0.480 | 0.513 |
| 10 | 0.323 | 0.369 | 0.409 | 0.457 | 0.489 |
| 11 | 0.308 | 0.352 | 0.391 | 0.437 | 0.468 |
| 12 | 0.296 | 0.338 | 0.375 | 0.419 | 0.449 |
| 13 | 0.285 | 0.325 | 0.361 | 0.404 | 0.432 |
| 14 | 0.275 | 0.314 | 0.349 | 0.390 | 0.418 |
| 15 | 0.266 | 0.304 | 0.338 | 0.377 | 0.404 |
| 16 | 0.258 | 0.295 | 0.327 | 0.366 | 0.392 |
| 17 | 0.250 | 0.286 | 0.318 | 0.355 | 0.381 |
| 18 | 0.244 | 0.279 | 0.309 | 0.346 | 0.371 |
| 19 | 0.237 | 0.271 | 0.301 | 0.337 | 0.361 |
| 20 | 0.232 | 0.265 | 0.294 | 0.329 | 0.352 |
| 21 | 0.226 | 0.259 | 0.287 | 0.321 | 0.344 |
| 22 | 0.221 | 0.253 | 0.281 | 0.314 | 0.337 |
| 23 | 0.216 | 0.247 | 0.275 | 0.307 | 0.330 |
| 24 | 0.212 | 0.242 | 0.269 | 0.301 | 0.323 |
| 25 | 0.208 | 0.238 | 0.264 | 0.295 | 0.317 |
| 26 | 0.204 | 0.233 | 0.259 | 0.290 | 0.311 |
| 27 | 0.200 | 0.229 | 0.254 | 0.284 | 0.305 |
| 28 | 0.197 | 0.225 | 0.250 | 0.279 | 0.300 |
| 29 | 0.193 | 0.221 | 0.246 | 0.275 | 0.295 |
| 30 | 0.190 | 0.218 | 0.242 | 0.270 | 0.290 |
| 31 | 0.187 | 0.214 | 0.238 | 0.266 | 0.285 |
| 32 | 0.184 | 0.211 | 0.234 | 0.262 | 0.281 |
| 33 | 0.182 | 0.208 | 0.231 | 0.258 | 0.277 |
| 34 | 0.179 | 0.205 | 0.227 | 0.254 | 0.273 |
| 35 | 0.177 | 0.202 | 0.224 | 0.251 | 0.269 |
| 36 | 0.174 | 0.199 | 0.221 | 0.247 | 0.265 |
| 37 | 0.172 | 0.196 | 0.218 | 0.244 | 0.262 |
| 38 | 0.170 | 0.194 | 0.215 | 0.241 | 0.258 |
| 39 | 0.168 | 0.191 | 0.213 | 0.238 | 0.255 |
| 40 | 0.165 | 0.189 | 0.210 | 0.235 | 0.252 |
| *n* > 40 |  |  |  |  |  |

\*The parameters of the normal distribution are prescribed by Null Hypothesis.

[From: *CRC Standard Probability and Statistics Tables and Formulae*, Student Edition, 2000]

**Critical Values for the Two-sample Kolmogorov–Smirnov test (2-sided)**

Table 3 gives critical *D*-values for ** = 0.05 (upper row) and ** = 0.01 (lower row) for various sample sizes. Asterisk \* means you cannot reject H0 regardless of observed *D*.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *n2*\*n1* | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | \*  \* | \*  \* | \*  \* | \*  \* | \*  \* | \*  \* | \*  \* | \*  \* | \*  \* | \*  \* |
| 2 | \*  \* | \*  \* | \*  \* | \*  \* | \*  \* | 16/16  \* | 18/18  \* | 20/20  \* | 22/22  \* | 24/24  \* |
| 3 | \*  \* | \*  \* | 15/15  \* | 18/18  \* | 21/21  \* | 21/24  24/24 | 24/27  27/27 | 27/30  30/30 | 30/33  33/33 | 30/36  36/36 |
| 4 |  | 16/16  \* | 20/20  \* | 20/24  24/24 | 24/28  28/28 | 28/32  32/32 | 28/36  32/36 | 30/40  36/40 | 33/44  40/44 | 36/48  44/48 |
| 5 |  |  | \*  \* | 24/30  30/30 | 30/35  35/35 | 30/40  35/40 | 35/45  40/45 | 40/50  45/50 | 39/55  45/55 | 43/60  50/60 |
| 6 |  |  |  | 30/36  36/36 | 30/42  36/42 | 34/48  40/48 | 39/54  45/54 | 40/60  48/60 | 43/66  54/66 | 48/72  60/72 |
| 7 |  |  |  |  | 42/49  42/49 | 40/56  48/56 | 42/63  49/63 | 46/70  53/70 | 48/77  59/77 | 53/84  60/84 |
| 8 |  |  |  |  |  | 48/64  56/64 | 46/72  55/72 | 48/80  60/80 | 53/88  64/88 | 60/96  68/96 |
| 9 |  |  |  |  |  |  | 54/81  63/81 | 53/90  70/90 | 59/99  70/99 | 63/108  75/108 |
| 10 |  |  |  |  |  |  |  | 70/100  80/100 | 60/110  77/110 | 66/120  80/120 |
| 11 |  |  |  |  |  |  |  |  | 77/121  88/121 | 72/132  86/132 |
| 12 |  |  |  |  |  |  |  |  |  | 96/144  84/144 |

For larger sample sizes, the approximate critical value *D* is given by the equation



where the coefficient *c*(**is given by the table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ** | 0.10 | 0.05 | 0.025 | 0.01 | 0.005 | 0.001 |
| *c*(** | 1.22 | 1.36 | 1.48 | 1.63 | 1.73 | 1.95 |

Examples: (1) At ** = 0.05 and samples sizes 5 and 8, *D* = 30/40 = 0.75.

(2) At ** = 0.01 and samples sizes 15 and 28, 

[From: *CRC Standard Probability and Statistics Tables and Formulae*, Student Edition, 2000]